Willamette/PNW Task Update
January 5, 2012

1. **How do your tasks provide you as a PAL the information to meet the topic goal?**
   - Our current and proposed tasks aim to develop broadly applicable metrics, models, and decision support tools for estimating the production and value of ecosystem goods and services for sustainable communities. Current work focuses on Willamette River Basin communities (see Bolte et al. Solutions journal article for details), and will broaden under SHC to include coastal and other inland communities (tbd) in the PNW. Coastal community work in the PNW will leverage models and methods for SSWR Chesapeake Bay tasks (1.2B and 4.3C) as well as economic models developed under ESRP (Messer, Wainger and others). Focal communities include agricultural townships (Calapooia watershed in the Willamette Valley), forest communities in the Willamette's Cascade Range (Blue River, OR among others), and a PNW coastal communities (tbd).
   - Our main task during FY12 is to produce a synthesis of lessons learned from ESRP Willamette Ecosystem Services Project (WESP):
     - Landscape and basin-scale simulations and associated peer-reviewed papers describing effects of alternative future land use and climate scenarios on tradeoffs among multiple ecosystem services (regulation of water quality and quantity, food and fiber production, greenhouse gases, source/sink control of nutrients and toxics, air quality, etc.);
       - <u>Manuscript update:</u>
         - Bolte et al. published Nov 2011 in Solutions journal special issue. This purpose of this paper was to provide an overview of the goals of ESRP's Willamette Ecosystem Services Project in terms that are understandable to the general public.
         - 8 VELMA papers in various stages for FY12: 1 in press (WRR); 1 in review; 3 in clearance, 3 in prep. These papers describe the quantification of ecosystem service tradeoffs (water quality and quantity, food/fiber production, greenhouse gases, nitrogen regulation, etc) in response to alternative land use and climate change scenarios
         - 3 HexSim papers in prep for FY12. These papers describe the effects of land use on endangered species (spotted owls and amphibians) in the PNW, and how certain human diseases can propagate through wildlife populations.
         - 1 SMURF manuscript in prep for FY12. This paper describes the SMURF model and its application for assessing human impacts on fish populations.
     - Integrated with the preceding WESP activities, we are continuing to develop a broadly applicable systems modeling and decision platform (e.g., Envision and associated plug-ins including VELMA, HexSim, SMURF, etc) that will initially be tested for a final round of Willamette simulations, and will be ready to apply for SHC applications, once the community typology and EGS classification system is ready.
       - <u>Specifics:</u>
         - Developed plug-in models for ENVISION decision support tool, including the SMURF fish population model (done), HexSim wildlife population model (done), and VELMA ecohydrology model (plug-in version of full model is in progress).]
         - Continuing wrap-up on Willamette sub-basin and basin scale applications focusing on effects of alternative land use and climate change scenarios on ES tradeoffs.
         - Initial planning underway for transition to new SHC PNW community-based case study in October 2012.

2. **How you will be helping communities become more sustainable--what do you bring to the table to allow the communities to become more sustainable?**

- A central theme of WESP/PNW is that ecosystem services are tightly linked, or "bundled," such that management decisions targeted for one service may have far reaching positive or negative impacts on other services. With this in mind we have developed analysis tools that support community decision making oriented around the provision of ecosystem services. Project outputs will enable communities to (1) explore tradeoffs in bundled ecosystem goods and services resulting from alternative decision choices, and (2) quantify community sustainability indicators and their trajectories to balance environmental, economic, social and institutional criteria over timescales relevant to immediate needs and long-term (decades to centuries) planning goals.
- With the preceding goals in mind, we hired an environmental economist, Dr. Mike Papenfus, In October 2012 to work on ES valuation for ESRP and SHC projects (WESP, PNW, Nitrogen). Mike has a PhD in Environmental Economics from the University of Wisconsin, and did a postdoc with the INVEST project at Sanford University.

3. How your work will help in balancing environmental, societal, and economic elements of sustainability?

- The Willamette River Basin, and PNW in general, provide services that are vital to society's well-being, yet these services are limited and have often taken for granted as being free. The historical pattern of resource use in the PNW has often been one of boom and bust, with unsustainable management practices leading to severe downturns in major industries, such as the once thriving salmon fishery and forest products industries. Through our research, we are addressing the question, can methodologies be developed to quantify and value of ecosystem services, so this "natural capital" can be better accounted for in decisions that affect the supply of the goods
  and services upon which human wellbeing depends?

4. How your work relates to the others in your project/theme and to theme 4 need?

- Goal is to develop tools and methods that can be applied and compared to other communities under the EGS project and, ultimately, nationally.
- With respect to Theme 4 need, the Envision decision support tool and associated plug-in models (VELMA, HexSim, SMURF, econometric models, etc.) aim to analyze the full costs and benefits of decisions, allowing them to consider impacts on the environment and community health in similar terms.

5. Are you working in the field, and if so, where and do you have a solid regional contact engaged in the work?

- Yes, we are working and collaborating in the field in a number of locations within the Willamette Basin:
  - Calapooia watershed, Willamette Valley collaborators and contacts include: Calapooia Watershed Council (farm community emphasis), EPA Region 10 (biofuel policy emphasis), USDA-ARS (agricultural data and research).
  - Blue River Watershed (Willamette sub-basin) collaborators and contacts include: US Forest Service, HJ Andrews Long Term Ecological Research site, Oregon State University sociologists conducting community surveys throughout this forest district.
  - Local, state and federal stakeholder contacts throughout Willamette Basin in support of Envision-based analyses of decisions affecting long-term water supplies in the Willamette Basin (in association with "Willamette 2100" NSF-funded project (John Bolte, PI).